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[TITLE OF THE INVENTION] INK SUPPLYING DEVICE

[ABSTRACT]

[Construction] An ink supplying device comprising: a hollow member 2, forming an ink flow path at a coupled surface side of an ink head; an ink tank 6, containing ink; and a stopper member 3, formed of an elastic material and disposed at a position, corresponding to the hollow member, of a coupled surface side of the ink tank.

[Effect] A thin film, inside the stopper member, which is inserted in the ink tank, is pushed and stretched by the hollow member, which forms an ink flow path in the printing head unit, and a flow path, leading from an ink-containing portion of the ink tank to the printing head unit is formed by the hollow member. The hollow member can also be used as guide in the coupling process, thereby facilitating connection with the ink tank and enabling an ink flow path to be secured definitely without leakage of ink or mixing in of debris.

[WHAT IS CLAIMED IS:]

[Claim 1] An ink supplying device, comprising: a hollow member, having an ink flow path to be disposed at a coupled surface side of an ink tank; the ink tank, having an ink-containing portion; and a stopper member, formed of an elastic material and disposed at a surface coupled to the ink tank at a position corresponding to the hollow member.

[Claim 2] An ink supplying device, comprising: a hollow

member, having an ink flow path to be disposed at a coupled surface side of an ink tank; the ink tank, having an ink-containing portion; and a stopper member, formed of elastic material, having a thin film in the interior thereof, having a hole, smaller than the hole diameter of the hollow member forming the ink flow path, at a central portion of the thin film, and disposed at a surface coupled to the ink tank at a position corresponding to the hollow member.

[Claim 3] The ink supplying device according to Claim 1 or 2, wherein the hollow member, forming the ink flow path at a coupled surface of an ink head, serves in common as an ink flow path and a positioning guide in a coupling process.

[DETAILED DESCRIPTION OF THE INVENTION]

[0001]

[Field of the Invention] This invention concerns the arrangement of an ink supplying device and concerns an ink supplying device suited for an inkjet printer.

[0002]

[Prior Arts] A conventional inkjet printer has a head, which discharges ink towards a recording medium, and an ink tank, which supplies ink to the head, positioned at a position separated from the ink head and coupled to the head via an ink supply tube.

[0003] However, with an inkjet printer with an arrangement wherein coupling for the ink is achieved by a supply

tube, since a long supply tube is generally required, laying of the supply tube is troublesome and degradation of printing quality occurs due to evaporation of ink and mixing in of air.

[0004]

[Problems to be Solved by the Invention] In regard to this point, there are also inkjet jet printers, with which a head and an ink tank are made integral. When the head and the ink tank are thus made integral, the issues of ink evaporation, mixing in of air, and supply tube of long tubing length can be resolved and the merit of easy handling is provided.

[0005] However, when the head and the ink tank are made integral, in the case where the ink inside an ink supply source runs out, the head, which is expensive in comparison to an ink supply portion, must be exchanged at a same time. There was thus an issue in terms of cost.

[0006] In regard to this point, there is, for example, the ink supplying device described in Japanese Utility Model Publication No. Sho-63-176635. In this Publication, an arrangement, with which a head and an ink supply source can be separated, is described. The arrangement of the state, in which the head and the ink supply source of the ink supplying device described in this Publication are separated, shall now be described using FIG. 4.

[0007] As shown in FIG. 4, a hollow needle-like member 15, forming an ink flow path, is disposed at a coupled surface

side of an ink head 14, and a stopper member 11, formed of elastic material, is disposed at a position, corresponding to hollow needle-like member 15, of a coupled surface of an ink supply source 16, which contains ink.

[0008] In the process of coupling ink head 14 and ink supply source 16, hollow needle-like member 15 is pierced through stopper member 11. An ink flow path is thereby formed and ink from ink-containing portion 12 of ink supply source 10 passes through hollow needle-like member 15 and the ink is thereby supplied to an ink holder 13 of ink head 14.

[0009] With the structure shown in FIG. 4, when the ink in ink supply source 10 runs out, just the ink supply source 16 needs to be exchanged, thus providing a merit in terms of cost. However, a guide for positioning and fixing is required for connecting the ink head 14 and there is thus the issue that the structure becomes complex.

[0010] Furthermore, since hollow needle-like member 15 is used as the ink flow path, when debris becomes attached to a side surface portion or tip of hollow needle-like member 15, which is pierced through stopper member 11, the debris enters inside ink supply source 16 and cause clogging of ink head 14.

[0011] An object of this invention is thus to resolve the above issues by providing an ink supplying device for inkjet printer, which can be installed readily in the process of exchanging an ink tank and enables an ink flow path to be secured

without fail.

[0012]

[Means for Solving the Problems] In order to achieve the above object, this invention's ink supplying device for inkjet printer employs the arrangement described below.

[0013] This invention's ink supplying device comprises: a hollow member, having an ink flow path disposed at a surface coupled to an ink tank; the ink tank, having an ink-containing portion; and a stopper member, formed of elastic material and disposed at a surface coupled to the ink tank at a position corresponding to the hollow member.

[0014]

[Actions] The hollow member, having the ink flow path and serving in common as the ink flow path and a guide for installation, is disposed at the surface coupled to the ink tank, and the stopper member, formed of elastic material, is disposed at the position, corresponding to the hollow member, of the coupled surface side of the ink tank.

[0015] Thus in the coupling process, the hollow member presses and stretches a thin film inside the stopper member and forms a flow path leading from the ink-containing portion of the ink tank to a printing head unit.

[0016] As a result, an ink supplying device can be provide with which the ink tank can be connected readily, there is no ink leakage nor mixing in of debris in the installation

process, and an ink flow path can be secured without fail upon installation.

[0017]

[Embodiments] The arrangement of an ink supplying device of an embodiment of this invention shall now be described using the drawings. FIG. 1 is a sectional view showing the state in which an ink supplying device and a head of this invention's embodiment have been disassembled.

[0018] As shown in FIG. 1, the ink supplying device comprises an ink tank 6, a stopper member 3, and a hollow member 2.

[0019] Stopper member 3 is formed of a rubber material, has a thin film 4 of thin thickness formed in the interior thereof, and has an ink hole 1, of a dimension smaller than an ink flow path 9 of hollow member 2, provided in a central portion of thin film 4.

[0020] Furthermore, stopper member 3 is provided with a circumferential projection 8 at a surface coupled to a printing head unit 1. Upon installation onto printing head unit 1, projection 8 is squashed, thereby putting printing head unit 1 and ink tank 6 in an airtight state. As a result, mixing in of air can be prevented when ink tank 6 and printing head unit 1 are coupled.

[0021] Hollow member 2 is disposed at the printing head unit 1 side and serves as a positioning guide for connecting

to ink tank 6 and as an ink flow path 9 for supplying ink to printing head unit 1.

[0022] Printing head unit 1 comprises an ink discharge port 5 and hollow member 2. Ink tank 6 and stopper member 3 are arranged to be detachable with respect to printing head unit 1.

[0023] FIG. 2 is a sectional view showing the state in which stopper member 3 is inserted into a coupled surface side of ink tank 6 and printing head unit 1 is installed.

[0024] As shown in FIG. 2, stopper member 3, formed of rubber material, is disposed at a position corresponding to hollow member 2, disposed in printing head unit 1.

[0025] Then by hollow member 2 stretching thin film 4 inside stopper member 3 and enlarging ink hole 10 greatly, an ink flow path, enabling smooth supply of ink from an ink-containing portion 7 to ink head unit 1, is formed.

[0026] Furthermore, in installing ink tank 6 onto printing head unit 1, hollow member 2 functions as a positioning guide.

[0027] FIG. 3 is a sectional view showing the state in which printing head unit 1 is separated. As shown in FIG. 3, when ink tank 6 is to be exchanged, ink tank 6 is separated in the direction indicated by arrow 17 in FIG. 3. The ink supplying device can thus be exchanged.

[0028] As shown in FIG. 3, in the state in which ink

tank 6 is separated, ink hole 10 of thin film 4 inside stopper member 3 returns to the original small hole by the shrinking of thin film 4, which had been stretched by hollow member 2.

[0029] The ink remaining in the interval between ink tank 6 and thin film 4 inside stopper member 6 when ink tank 6 is separated will thus not leak to the exterior but will be absorbed into ink-containing portion 7 by the capillary force inside ink tank 6, and the soiling of the surroundings due to leakage of ink can thus be prevented.

[0030]

[Effects of the Invention] As described above, with the present invention, the hollow member, which forms the ink flow path in the printing head unit, pushes and stretches the thin film inside the stopper member, which is inserted in the ink tank, to form a flow path, leading from the ink-containing portion of the ink tank to the printing head unit.

[0031] Thus the hollow member can be used as a guide for the coupling process as well, the connection to the ink tank is facilitated, there is no ink leakage nor mixing in of debris, and the ink flow path can be secured without fail.

[BRIEF DESCRIPTION OF THE DRAWINGS]

[FIG. 1] A sectional view showing the overall arrangement of an ink supplying device of an embodiment of this invention in a separated state.

[FIG. 2] A sectional view showing the ink supplying

device of this invention's embodiment in the state of being coupled to a printing head.

[FIG. 3] A sectional view showing the ink supplying device of this invention's embodiment in the state of being separated from the printing head.

[FIG. 4] A sectional view showing the arrangement of an ink supplying device of a prior-art example.

[Description of Symbols]

1 Printing head unit

2 Hollow member

3 Stopper member

4 Thin film

5 Ink discharge port

6 Ink tank

7 Ink-containing portion

8 Projection

9 Ink flow path

10 Ink hole

[FIG. 1]

Printing head unit

Hollow member

Stopper member

Thin film

Ink tank

Ink flow path

[FIG. 4]

11 Stopper member

12 Ink-containing portion

13 Ink holder

14 Ink head

15 Hollow needle-like member

16 Ink supply source